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## THE HYPOCREALES OF NORTH AMERICA—II

FRED J. SEAVER

(WITH PLATE 13, CONTAINING 15 FIGURES)

### Tribe II. CREONECTRIEAE

Conidial phase profuse, giving rise to a stroma producing at first conidiophores and conidia, later perithecia; stroma fleshy, depressed, tubercular or stalked, conidia variable; perithecia seated on or surrounding the stroma; usually in dense caespitose clusters or occasionally scattered but always entirely superficial; perithecia and spores as in Nectrieae.

Stroma upright, stalked, surrounded at the base by the caespitose perithecia.

Spores 1-septate.

12. SPHAEROSTILBE.

Spores muriform.

13. MEGALONECTRIA.

Stroma depressed or tubercular, often concealed at maturity by the perithecia.

Spores simple.

Spores hyaline.

14. ALLANTONECTRIA.

Spores brown.

15. SPHAERODERMATELLA.

Spores compound.

Spores 1-septate.

Spores hyaline.

16. CREONECTRIA.

Spores brown.

17. MACBRIDELLA.

Spores more than 1-septate.

Perithecia dark blue (black to naked eye). 18. GIBBERELLA.

Perithecia bright colored, red, yellow, etc.

Perithecia caespitose on a depressed stroma.

19. SCOLECONECTRIA.

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Perithecia echinulately arranged on a subglobose stroma.	20. ECHINODOTHIS.
Spores muriform.	
Spores hyaline.	21. THYRONECTRIA.
Spores brown.	22. THYRONECTROIDEA.

12. SPHAEROSTILBE Tul. Fung. Carp. 1: 130 (in note). 1861

Stroma (*Stilbum*, *Atractium*, *Microcera*) consisting of a slender stalk with a subglobose head or conical in form; perithecia bright colored, membranaceous, globose, subglobose or ovate; asci cylindrical or subcylindrical, 8-spored; spores hyaline, 1-septate, elliptical or subelliptical.

Type species: *Stilbum aurantiacum* Babingt.

Stroma consisting of a slender stalk with a clavate or subglobose head.

Spores small, 10-14 × 4-6 mic.

1. *S. gracilipes*.

Spores large, 22-26 × 7 mic.

2. *S. cinnabarina*.

Stroma conical in form.

On bark.

3. *S. flammea*.

On scale insects.

4. *S. coccophila*.

1. SPHAEROSTILBE GRACILIPES Tul. Fung. Carp. 1: 130. 1861

*Stilbum gracilipes* Tul. Ann. Sci. Nat. IV. 5: 114. 1856.

*Stilbum corynoides* Ellis & Everh. Jour. Myc. 1: 153. 1885.

Stroma consisting of a slender stalk 2-3 mm. high of a grayish color with a globose, orange head .5-1 mm. in diameter; conidia elliptical, hyaline, 5-6 × 2 mic.; perithecia in dense cespitose clusters 1-2 mm. in diameter at the base of the stalked stroma, 15-30 in each cluster, reddish, becoming pale (in dried specimens often pale yellow), 250-300 mic. in diameter, nearly globose, partially collapsing or entire, slightly roughened; asci cylindrical, 75-80 × 7-8 mic.; 8-spored; spores mostly 1-seriate, elliptical to subfusoid, hyaline, 1-septate, 10-14 × 6 mic., usually not constricted.

On bark of various trees and shrubs, *Carya*, *Citrus*, *Hibiscus*, *Platanus*.

TYPE LOCALITY: Europe.

DISTRIBUTION: S. Carolina to Florida and Louisiana.

ILLUSTRATIONS: Ellis & Everh. N. Am. Pyrenom. pl. 12, f. 1-4.

EXSICCATI: Ellis & Everh. N. Am. Fungi, 2131, 2132; Ravenel, Fungi Am. Exsicc. 285; Other specimens examined: Florida, Nash.

2. SPHAEROSTILBE CINNABARINA (Mont.) Tul. Fung. Carp.  
I: 130. 1861

*Stilbum (Atractium) cinnabarinum* Mont. Ann. Sci. Nat. II. 8:  
360. 1837.

Stroma with a slender stalk 1-2 mm. long and a globose or clavate, red head; conidia nearly elliptical, straight or a little curved,  $3-5 \times 2$  mic., granular within; perithecia few, surrounding the base of the stalked stroma, sessile, globose, smooth, orange, finally partially collapsed; asci clavate, about  $80 \times 13-16$  mic.; spores 2-seriate, ovate,  $22-26 \times 7$  mic., filled with numerous oil-drops.

On bark of trees and shrubs.

TYPE LOCALITY: Cuba.

DISTRIBUTION: S. Carolina to Mexico and Cuba.

EXSICCATI: Ellis & Everh. N. Am. Fungi 2133. Other specimens examined: Cuba, *Wright*; Louisiana, *Langlois 168, 2179*.

The specimens examined did not show mature perithecia and measurements of asci and spores are from Saccardo. The conidial phase scarcely differs from *Sphaerostilbe gracilipes* Tul.

3. SPHAEROSTILBE FLAMMEA (Berk. & Rav.) Tul. Fung.  
Carp. I: 130. 1861

*Atractium flammeum* Berk. & Rav.; Berk. & Broome, Ann. Mag.  
Nat. Hist. 13: 461. 1854.

*Stilbum flammeum* Tul. Ann. Sci. Nat. IV. 5: 114 (No. 757). 1856.

Stroma conical in form with the top finally becoming flattened; conidia fusiform, a little curved, 5-8-septate, about  $60-75 \times 5-7$  mic.; perithecia nearly globose, bright red, smooth or only minutely rough, crowded on or near the base of the stroma; asci cylindrical, about  $75-80 \times 8-10$  mic., 8-spored; spores 1-septate, elliptical to subfusoid, 1-septate, hyaline,  $15 \times 6-7$  mic.

On bark of trees, *Acer*, *Crataegus*, *Salix*.

TYPE LOCALITY: Europe.

DISTRIBUTION: Ontario to Louisiana and S. Carolina.

ILLUSTRATIONS: Tul. Fung. Carp. 3: pl. 13, f. 10-13.

EXSICCATI: Ellis & Everh. N. Am. Fungi, 3311. Other specimens examined: Louisiana, *Langlois 2290*; N. Jersey, *Ellis*; Ontario, Canada, *Dearness*.

4. SPHAEROSTILBE COCCOPHILA (Desm.) Tul. Fung. Carp.  
3: 105. 1865

*Microcera coccophila* Desm. Ann. Sci. Nat. III. 10: 359. 1848.

? *Nectria aurantiicola* Berk. & Br. Jour. Linn. Soc. 14: 117.  
1875.

? *Nectria aglaeothele* Berk. & Curtis, Grevillea 4: 45. 1875.

*Nectria subcoccinea* Sacc. & Ellis, Michelia 2: 570. 1882.

Stroma consisting of a short, stout stalk with an orange head; conidia straight or more often curved, long, fusiform, 3-7-septate, 50-90  $\times$  5-6 mic., occasionally shorter; perithecia more or less cespitose, bright orange, with a prominent, rather acute ostiolum; asci cylindrical, 75  $\times$  8-10 mic., 8-spored; spores 1-seriate, elliptical or subelliptical, 12-18  $\times$  7-9 mic.

On dead scale insects on bark, etc.

TYPE LOCALITY: France.

DISTRIBUTION: Florida to Alabama, Pennsylvania and the West Indies.

ILLUSTRATIONS: Fawcett, Bull. Fl. Agric. Exp. Sta. 94: f. 2-3.

EXSICCATI: Ellis, N. Am. Fungi, 1333; Ravenel, Fungi Car. Exsicc. 57. Other specimens examined: Florida, Hume 39.

The exsiccati cited are distributed under other names but both show the characteristic conidia and perithecia of the above species. Also both occur on scale insects.

13. MEGALONECTRIA Speg. An. Soc. Ci. Argent. 12: 82. 1881

Stroma consisting of a slender stalk with a globose head; perithecia globose or subglobose, bright colored, red or reddish, entire or collapsing, borne in cespitose clusters on or surrounding the base of the stroma; asci clavate, 8-spored; spores elliptical, many-septate, becoming muriform, hyaline.

Type species: *Sphaeria pseudotrichia* Schw.

Distinguished from *Sphaerostilbe* by the muriform spores.

- I. MEGALONECTRIA PSEUDOTRICHIA (Schw.) Speg. An. Soc. Ci. Argent. 12: 82. 1881

*Sphaeria pseudotrichia* Schw.; Berk. & Curtis, Jour. Acad. Nat. Sci. Phil. II. 2: 289. 1853.

*Nectria pseudotrichia* Berk. & Curt. Jour. Acad. Nat. Sci. Phil. II. 2: 289. 1853.

*Sphaerostible pseudotrichia* Berk. & Broome, Jour. Linn. Soc. 14: 114. 1875.

Stroma consisting of a slender stalk with a subglobose, reddish head; conidia  $3-5 \times 2$  mic., hyaline; perithecia nearly globose, subcespitose, usually in or surrounding the base of the stroma, red, minutely rough, finally collapsing; asci clavate, very broad, 8-spored,  $60-75 \times 20-22$  mic.; spores, 2-seriate or irregularly crowded, large, 7-9-septate and muriform, yellowish-hyaline,  $25-35 \times 7-8$  mic. (*pl. 13, f. 1-2*).

On bark, wood, etc.

TYPE LOCALITY: Surinam, S. America.

DISTRIBUTION: West Indies.

ILLUSTRATIONS: Berk. & Curtis, Jour. Acad. Nat. Sci. Phil. 2: *pl. 25, f. 9*.

SPECIMENS EXAMINED: Cuba, *Murrill 156*; Jamaica, *Cockerell 37*; Porto Rico, *Heller 773, 775*; S. America, ex. Herb. *Schweinitz*.

#### DOUBTFUL SPECIES

*Megalonectria caespitosa* Speg. Bol. Acad. Nat. Cien. Corb. 11: 541. 1889.

This species has been distinguished by the larger spores which range from  $30-45 \times 10-12$ . The only specimen examined is from the herbarium of Prof. Bessey and according to the label was found on wood supporting a south Mexican orchid in the greenhouse at Lincoln, Nebraska.

14. ALLANTONECTRIA Earle; Greene, Plantae Bakerianae 2:

11. 1901

*Nectriella* Sacc. (in part).

Perithecia bright colored, red, occurring in cespitose clusters on a stroma as in *Creonectria*; asci cylindrical to clavate, 8-spored; spores allantoid, simple, hyaline.

Type species: *Allantonectria Yuccae* Earle.

Distinguished from *Creonectria* by the simple spores which in the type species are allantoid in form.

#### I. ALLANTONECTRIA YUCCAE Earle l. c.

Perithecia densely cespitose in clusters of 12-20, seated on a stroma; perithecial clusters erumpent, thickly scattered or sub-

confluent, averaging about 1 mm. in diameter; perithecia bright red becoming dull red with age, subglobose, smooth, or minutely roughened, partially collapsing when dry, 100-125 mic. in diameter; asci clavate or cylindrical, 8-spored; spores 2-seriate or irregularly crowded, allantoid,  $4-5 \times 1$  mic.

On dead leaves of *Yucca* sp.

TYPE LOCALITY: Hermosa, Colorado.

DISTRIBUTION: Known only from type locality.

SPECIMENS EXAMINED: Colorado, *Baker* (type).

This species scarcely differs from Rouméguere's *Fungi Sel. Exsicc.*, 6860 and Saccardo's *Mycotheca Ital.* 866 so far as we can see, both of which are labeled *Nectriella mitina* (Mont.) Sacc. The species however is probably distinct from that species, in which the spores are described as ovoid.

### 15. *Sphaerodermatella* gen. nov.

Stroma erumpent, fleshy; perithecia in dense cespitose clusters seated on the stroma which is entirely obscured at maturity, more or less rough and furfuraceous; asci broad-clavate to ovoid, 4-8-spored; spores simple becoming dark colored and opaque.

Distinguished from *Sphaeroderma* by the absence of effuse stroma and the cespitose arrangement of the perithecia.

#### 1. *Sphaerodermatella Helleri* (Earle)

*Melanospora* (?) *Helleri* Earle, *Muhlenbergia* 1: 13. 1901.

*Sphaeroderma Helleri* Sacc. & Sacc. *Syll. Fung.* 17: 781. 1905.

Stroma erumpent; perithecia superficial, densely cespitose, 3 or 4-20 on an indistinct basal stroma, large, .5-1 mm. in diameter, deeply collapsing, grayish externally from irregular, flat, finally deciduous, wart-like projections apparently formed by the cracking of the hard outer layer; substance of the perithecial wall of a dark brown color, soft, composed of small-celled parenchyma; ostium slightly prominent when young, perforation obscure when collapsed; asci oblong, about  $100 \times 30$  mic., soon evanescent; 4-8-spored; spores 2-seriate, elliptical, simple, at first hyaline, finally opaque and black, surrounded with a more or less distinct hyaline coating about  $25-28 \times 12-20$  mic.; expelled and blackening the matrix when mature; paraphyses indistinct.

On bark of tree.

TYPE LOCALITY: Porto Rico.

DISTRIBUTION: Known only from type locality.

SPECIMENS EXAMINED: Porto Rico, *Heller* (type).

16. *Creonectria* gen. nov.

*Nectria* Fries, Summa Veg. Scand. 387 (in part). 1849.

Stroma fleshy or subfleshy, tubercular or depressed, red, yellow, brown, or occasionally black (at least with age); perithecia globose or subglobose with the ostiolum often depressed with age, smooth, verrucose or furfuraceous, superficial on or surrounding the stroma; asci cylindrical, or clavate, 8-spored, with the spores occasionally accompanied by numerous other minute spore-like bodies in the ascus; spores 1-2-seriate or irregularly crowded, elliptical to fusoid, straight or curved, 1-septate, hyaline; paraphyses present or not evident.

Type species: *Tremella purpurea* L.

Distinguished from *Nectria* by the presence of a stroma.

Conidial phase represented by *Tubercularia*, *Verticillium*, etc.

Perithecia some shade of red, scarlet, brick-red or brownish-black.

Perithecia dull brick-red becoming brown or black with age.

Ascospores not accompanied by spore-like bodies in the ascus.

Perithecia verrucose, covered with coarse granules.

Stroma tubercular, prominent.

1. *C. purpurea*.

Stroma concave, not rising above the surface of the substratum.

2. *C. verrucosa*.

Perithecia smooth or only minutely rough, becoming black with age.

3. *C. atrofusca*.

Ascospores accompanied by minute spore-like bodies in the ascus.

4. *C. Coryli*.

Perithecia scarlet or blood-red, becoming reddish-purple with age.

Spores elliptical or subelliptical with ends obtuse.

Perithecia collapsing with age.

Becoming truncate.

5. *C. pithoides*.

Becoming pezizoid when collapsed.

6. *C. rubicarpa*.

Perithecia entire; ostiolum very prominent.

7. *C. mammoidea*.

Spores fusoid with ends acute or subacute.

Spores narrow-fusoid, 3 times as long as broad.

8. *C. coccinea*.

Spores broad-fusoid, 2 times as long as broad.

- Comparatively small, not more than 16 mic. long.  
 Perithecia vertically collapsing, on *Diatrypella*. 9. *C. nipigonensis*.  
 Perithecia mostly entire, on coniferous wood. 10. *C. Cucurbitula*.  
 Comparatively large, 20-25 mic. long. 11. *C. diploa*.  
 Perithecia pale rose-colored or some shade of yellow or yellowish-white.  
 Perithecia in cespitose clusters on the stroma.  
 Spores 10-14 × 3-3.5 mic.  
 Conidial phase profuse on decaying seeds. 12. *C. seminicola*.  
 Conidial phase consisting of isolated tubercular stromata. 13. *C. ochroleuca*.  
 Spores 12-14 × 5 mic. 14. *C. grammicospora*.  
 Perithecia scattered over the surface of a tubercular stroma. 15. *C. tuberculariformis*.

### I. *Creonectria purpurea* (L.)

- Tremella purpurea* L. Sp. Pl. 2: 1158. 1753.  
*Sphaeria tremelloides* Weigel. Obs. Bot. 46. 1772.  
*Tubercularia vulgaris* Tode, Fungi Meckl. 1: 18. 1790.  
*Sphaeria cinnabarina* Tode, Fungi Meckl. 2: 9. 1791.  
*Cucurbitaria cinnabarina* Greville, Scot. Fl. Crypt. 3: 136. 1825.  
*Nectria cinnabarina* Fries, Summa Veg. Scand. 388. 1849.  
*Nectria Sambuci* Ellis & Everh. Proc. Acad. Nat. Sci. Phil. 1890: 246. 1891.  
*Nectria Meliae* Earle, Bull. Torrey Club 25: 364. 1898.  
*Nectria Russellii* Berk. & Broome, Grevillea 4: 45.  
*Nectria offuscata* Berk. & Curtis, Grevillea 4: 45.  
*Nectria nigrescens* Cooke, Grevillea 7: 50.  
*Sphaeria dematiosa* Schw. Trans. Am. Phil. Soc. II. 4: 205. 1832.  
*Sphaeria Celastri* Schw.; Fries, El. Fung. 2: 81. 1827.  
*Nectria purpurea* (L.) Wilson & Seaver, Jour. Myc. 13: 51. 1907.

Stroma erumpent, tubercular, at first pinkish or yellowish-red becoming darker with age, often brownish and occasionally quite black, 1-2 mm. in diameter and 1-2 mm. high; conidiophores 50-100 mic. long with short lateral branches on which the conidia are borne; conidia 4-6 × 2 mic., elliptical, hyaline; perithecia



springing at first from the base of the stroma which at maturity is concealed by the cespitose clusters of perithecia; individual perithecia nearly globose with the ostiolum rather prominent, becoming slightly collapsed, at first bright, cinnabar-red, becoming darker with age, often brown and occasionally black (when weathered); roughened externally with coarse granules 375-400 mic. in diameter; asci clavate, 8-spored,  $50-90 \times 7-12$  mic.; spores mostly 2-seriate, elliptical, elongated, about 3 times as long as broad with the ends obtuse, 1-septate, hyaline, mostly a little curved,  $12-20 \times 4-6$  mic.; paraphyses very delicate.

On bark of various kinds of deciduous trees and shrubs; *Acer*, *Amorpha*, *Ampelopsis*, *Berberis*, *Carya*, *Calycanthus*, *Celastrus*, *Cornus*, *Euonymus*, *Melia*, *Morus*, *Populus*, *Prunus*, *Pyrus*, *Quercus*, *Rhus*, *Ribes*, *Robinia*, *Rubus*, *Sambucus*, *Tilia*, *Ulmus*.

TYPE LOCALITY: Europe.

DISTRIBUTION: Maine to California and from Ontario to S. Carolina, probably common throughout N. America.

ILLUSTRATIONS: Tode, *Fungi Meckl. pl. 9, f. 68*; Tulasne, *Fung. Carp. 3: pl. 12*; E. & P. *Nat. Pfl. Fam. 1<sup>1</sup>: f. 239, A-D.*; Winter, *Rabenh. Krypt. Fl. 1<sup>2</sup>: 87. f. 1-3.*

EXSICCATI: Ellis, *Fungi Nova Caesareenses, 68*; Ellis, *N. Am. Fungi, 468*; Ellis & Everhart, *Fungi Columbiani, 115*; Bartholomew, *Fungi Columbiani, 2334, 2847*; Ravenel, *Fungi Am. Exsicc. 339, 4119.*

Other specimens examined: Types or cotypes of the following synonyms have been examined: *Nectria Sambuci* Ellis & Everh., *Nectria Meliae* Earle, *Nectria Russellii* Berk. & Broome, *Nectria offuscata* Berk. & Curtis, *Nectria nigrescens* Cooke, *Sphaeria dematiosa* Schw., and *Sphaeria Celastri* Schw.

This is probably the most common and widely distributed species of the entire order and since it is very variable has been many times redescribed.

## 2. *Creonectria verrucosa* (Schw.)

*Sphaeria verrucosa* Schw. *Trans. Am. Phil. Soc. II. 4: 204.*  
1832.

*Nectria verrucosa* Sacc. *Syll. Fung. 2: 509.* 1883.

Stroma fleshy, concave or convex, scarcely rising above the surface of the substratum; perithecia cespitose in clusters 1-2 mm. in diameter, erumpent through the outer bark; individual

perithecia nearly globose, dull red, very rough externally with coarse granules, 250–300 mic. in diameter; asci cylindrical to clavate, 8-spored, 50–65 × 5–6 mic.; spores 2-seriate, 1-septate, elliptical, with ends obtuse, straight or a little curved, usually not constricted, 12–16 × 4 mic.

On dead branches of *Morus*, *Sassafras* and *Melia*.

TYPE LOCALITY: Pennsylvania.

DISTRIBUTION: Delaware to N. Dakota and Alabama.

ILLUSTRATIONS: Ellis & Everh. N. Am. Pyrenom. *pl.* 12, *f.* 13–19.

EXSICCATI: Ellis & Everhart, N. Am. Fungi, 2371. Other specimens examined: Alabama, *Little*; Connecticut, *Thaxter*; Delaware, *Commons*; N. Jersey, *Ellis*; N. Dakota, *Seaver*; Pennsylvania, *Schweinitz* (type); S. Carolina, *Ravenel*.

Distinguished from *C. purpurea* (L.) Seaver only by the depressed stroma.

### 3. *Creonectria atrofusca* (Schw.)

*Sphaeria atrofusca* Schw. Trans. Am. Phil. Soc. II. 4: 206. 1832.

*Nectria atrofusca* Ellis & Everh. Jour. Myc. 1: 140. 1885.

Stroma fleshy or subfleshy, rather dark colored, erumpent but not rising much above the surface of the bark; perithecia in cespitose clusters on the stroma, clusters variable in size, averaging 1–2 mm., dark colored, nearly black in dried specimens, brownish-black with transmitted light, small mostly less than 200 mic. in diameter, subglobose with a prominent papilliform ostiole, mostly collapsing when dry; asci subcylindrical, 45–50 × 7 mic., 8-spored; spores partially 2-seriate above, 1-seriate below, hyaline, 1-septate, slightly constricted at the septum, subfusoid with the ends slightly narrowed.

On dead branches of *Staphylea trifolia*.

TYPE LOCALITY: Pennsylvania.

DISTRIBUTION: Pennsylvania.

EXSICCATI: Ellis, N. Am. Fungi, 1547. Other specimens examined: Pennsylvania, *Schweinitz* (type).

The species is distinguished by its host as well as the very dark colored perithecia.

### 4. *Creonectria Coryli* (Fuckel)

*Nectria Coryli* Fuckel, Symb. Myc. 180. 1869.

*Chilonectria Coryli* Ellis & Everh. N. Am. Pyrenom. 116. 1892.

Perithecia cespitose on an erumpent stroma, globose, smooth, at first bright red becoming blackish, entirely black in weathered specimens, collapsing becoming pezizoid; asci clavate,  $85-100 \times 10-12$  mic., 8-spored but with spores often obscured by numerous, allantoid spore-like bodies which are present in the ascus; spores fusoid, 1-septate, with a short curved appendage at each end,  $10-15 \times 2.5-3$  mic.

On branches of deciduous trees and shrubs; *Betula*, *Corylus*, *Crataegus*, *Lonicera*, *Populus*, *Rhus*, *Salix*, *Symphoricarpus*.

TYPE LOCALITY: Europe.

DISTRIBUTION: New Jersey to Ontario and N. Dakota.

EXSICCATI: Ellis, N. Am. Fungi, 159. Other specimens examined: Delaware, *Commons*; New Jersey, *Ellis*; N. Dakota, *Brenckle*; Ontario, Canada, *Dearness*.

The species is very distinct in its spore characters.

##### 5. *Creonectria pithoides* (Ellis & Everh.)

*Nectria pithoides* Ellis & Everh. Proc. Acad. Nat. Sci. Phil. 1890: 247. 1891.

Stroma erumpent, yellowish; perithecia seated on the stroma in dense clusters 1.5-2.5 mm. in diameter, individual perithecia bright red, collapsing so as to become truncate, resembling the head of a barrel with the ostiolum appearing as a light translucent dot in the center, 200-250 mic. in diameter; asci cylindrical,  $70-80 \times 5$  mic., 8-spored; spores elliptical, 1-septate, with an oil-drop in each cell, hyaline,  $6-10 \times 3-4$  mic. (*pl.* 13, *f.* 3-4).

On bark of dead alders.

TYPE LOCALITY: British Columbia.

DISTRIBUTION: Known only from type locality.

EXSICCATI: Ellis & Everh. N. Am. Fungi, 2750 (cotype).

Distinguished by the bright red perithecia which are decidedly barrel-shaped when dry.

##### 6. *Creonectria rubicarpa* (Cooke)

*Nectria rubicarpa* Cooke, Grevillea 7: 50. 1878.

Perithecia cespitose in small, dense clusters, 1-2 mm. in diameter, minutely roughened, bright red becoming darker with age, collapsing and becoming deeply pezizoid; asci cylindrical to clavate,  $55-60 \times 6$  mic., 8-spored; spores 1-seriate or partially 2-seriate above, elliptical, hyaline, 1-septate,  $10-13 \times 4-4.5$  mic. scarcely constricted (*pl.* 13, *f.* 11-12).

On dead limbs of *Gelsemium* and stems of *Ilex*.

TYPE LOCALITY: South Carolina.

DISTRIBUTION: New Jersey to Alabama.

EXSICCATI: Ellis, N. Am. Fungi, 80; Ravenel, Fungi Am. Exsicc. 341. Other specimens examined: Alabama, *Earle*; New Jersey, *Ellis*.

The species is distinguished by the dense clusters of collapsing perithecia and the small size of the spores.

### 7. *Creonectria mammoidea* (Phil. & Plow.)

*Nectria mammoidea* Phil. & Plow. Grevillea 3: 126. 1875.

Perithecia cespitose in clusters 1-3 mm. in diameter or more or less scattered, surrounding a brownish stroma, very large, averaging about 500 mic. in diameter, ovate, tapering above into a large, obtuse ostiolum, bright red with ostiolum often darker, shining, entire; asci cylindrical or slightly clavate,  $100 \times 7-8$  mic., 8-spored; spores 1-seriate or partially 2-seriate above, oblique, sub-fusoid, 1-septate, usually slightly unequal-sided,  $18-20 \times 6-7$  mic.

On wood and bark.

TYPE LOCALITY: England.

DISTRIBUTION: New Jersey to Ontario.

ILLUSTRATIONS: Grevillea 3: pl. 42, f. 5.

SPECIMENS EXAMINED: New Jersey, *Ellis*; Ontario, *Macoun*; also specimens from the herbarium of *Plowright*.

### 8. *Creonectria coccinea* (Pers.)

? *Sphaeria decidua* Tode, Fungi Meckl. 2: 31. 1791.

*Sphaeria coccinea* Pers. Ic. et Descr. 2: 47. 1800.

*Nectria coccinea* Fries, Summa Veg. Scand. 388. 1849.

Stroma yellowish, springing from the crevices of bark in irregular patches; perithecia cespitose in dense irregular clusters often several mm. in diameter, or occasionally scattered around the stroma; individual perithecia ovate with a prominent ostiolum, bright red, almost scarlet, color somewhat variable, smooth or very minutely roughened, mostly entire, about 300 mic. in diameter; asci cylindrical or clavate, 8-spored,  $80-90 \times 8-10$  mic.; spores 1-seriate, fusoid,  $12-16 \times 4-5$  mic.

On bark or more rarely on decorticated wood, *Acer*, *Fagus*, *Fraxinus*, *Magnolia*, *Melia*, *Ulmus*, etc.

TYPE LOCALITY: Europe.

DISTRIBUTION: Vermont to N. Dakota and W. Virginia, probably extending over a much wider range.

ILLUSTRATIONS: Pers. Ic. & Descr., *pl. 12, f. 2.*

EXSICCATI: Ellis, *N. Am. Fungi*, 161; Ellis & Everh. *N. Am. Fungi*, 618; E. Barholomew, *Fungi Columbiani*, 2043, 2238. Other specimens examined: New York, *Clinton, Seaver*; N. Dakota, *Seaver*; N. Jersey, *Ellis*; Ontario, Canada, *Dearness*; Vermont, *Burt, Orton*; W. Virginia, *Orton*.

So far as we can see the species scarcely differs from *Nectria ditissima* Tul. If the two species are distinct, the characters are so poorly understood that they have been badly confused. The specimens examined which have been referred to these two names are identical.

#### 9. *Creonectria nipigonensis* (Ellis & Everh.)

*Nectria nipigonensis* Ellis & Everh. *Proc. Acad. Nat. Sci. Phil.* 1893: 129. 1893.

Stroma depressed, yellowish, about .5 mm. in diameter; conidia minute, allantoid,  $3-4 \times 1$  mic.; perithecia cespitose, nearly globose, about 250 mic. in diameter, reddish becoming darker with age, finally collapsing at the apex, smooth; asci cylindrical, 8-spored,  $50-55 \times 6-7$  mic.; spores 1-seriate, fusoid or occasionally subelliptical, 1-septate, usually not constricted at the septum.

On the erumpent disc of *Diatrypella*.

TYPE LOCALITY: Lake Nipigon, Canada.

DISTRIBUTION: Known only from type locality.

SPECIMENS EXAMINED: Canada, *Macoun* (type).

Distinguished by the pezizoid perithecia and broad-fusoid spores.

#### 10. *Creonectria Cucurbitula* (Sacc.)

*Nectria Cucurbitula* Sacc. *Michelia* 1: 409. 1878. Not *N. Cucurbitula* (Tode) Fr.

Perithecial clusters erumpent and often very irregular in form, 1-2 mm. in diameter, consisting of numerous densely cespitose perithecia; individual perithecia bright red later becoming reddish-purple, ovate with a prominent rather obtuse ostiolum, entire or very rarely collapsing; asci cylindrical or clavate,  $75-100 \times 6-8$  mic., 8-spored; spores at first crowded and partially 2-seriate, finally becoming 1-seriate, obliquely arranged with ends over-

lapping, broad-fusoid, rarely subelliptical, 1-septate and not constricted at the septum, hyaline,  $14-16 \times 5-7$  mic. (mostly  $15 \times 7$  mic.).

On bark of *Pinus*, *Abies* and *Larix*.

TYPE LOCALITY: Europe.

DISTRIBUTION: Newfoundland to New York and Ontario.

SPECIMENS EXAMINED: Newfoundland, *Waghorne*; New York, *Peck*; Ontario, Canada, *Macoun*.

The species is distinct both in external and internal characters.

### 11. *Creonectria diploa* (Berk. & Curtis)

*Nectria diploa* Berk. & Curtis, Jour. Linn. Soc. 10: 378. 1869.

Perithecia in dense erumpent clusters about .5 mm. in diameter, individual perithecia minute, ovate, nearly smooth, bright red, finally collapsing; asci cylindrical, 8-spored; spores vertically 2-seriate, very large, fusoid, 1-septate, hyaline, with 2-4 oil-drops,  $20-25 \times 7-10$  mic.

On bark of *Alnus* sp.

TYPE LOCALITY: S. Carolina.

DISTRIBUTION: Known only from type locality.

EXSICCATI: Ravenel, Fungi Car. Exsicc. 55.

Individual perithecia resemble those of *Nectria episphaeria* (Tode) Fries but differ in the very large size of the spores. The dense clusters of perithecia seem to indicate the presence of a stroma although the specimens are too old to show any definite stroma.

### 12. *Creonectria ochroleuca* (Schw.)

*Sphaeria ochroleuca* Schw. Trans. Am. Phil. Soc. II. 4: 204. 1832.

*Nectria ochroleuca* Berk. Grevillea 4: 16. 1875.

*Nectria aureofulva* Cooke & Ellis, Grevillea 7: 8. 1878.

*Nectria depauperata* Cooke, Grevillea 7: 50. 1878.

*Nectria vulgaris* Speg. Anal. Soc. Ci. Arg. 12: 75. 1881.

*Verticillium tubercularioide* Speg. Anal. Soc. Ci. Arg. 12: 125. 1881.

? *Nectria rhizogena* Grevillea 11: 108. 1883.

*Nectria pallida* Ellis & Everh. Proc. Phil. Acad. Nat. Sci. 1894: 325. 1894.

Stromata small, tubercular, 1-2 mm. in diameter, whitish to pink or flesh-colored, often floccose with the erect verticillate conidiophores; branches of the conidiophores ascending perpendicularly and each bearing at its summit a single conidium; conidia elliptical, hyaline,  $5-8 \times 3$  mic. often granular within; perithecia occurring in dense clusters ranging from 3-5 to many perithecia, clusters very variable in form; individual perithecia small, nearly globose with the prominent papilliform ostium, smooth or only minutely rough, at first flesh-colored, when dry becoming pale yellow or almost white, 200-300 mic. in diameter, entire or occasionally collapsing becoming pezizoid; asci clavate, 8-spored,  $50 \times 5-7$  mic.; spores 2-seriate above, 1-seriate below or often irregularly crowded, fusoid with ends acute, a little constricted at the septum, hyaline,  $8-12 \times 3-4$  mic.

On bark of various kinds of trees, *Andromeda*, *Betula*, *Carpinus*, *Carya*, *Clethra*, *Citrus*, *Laurus*, *Magnolia*, *Platanus*, *Salix*, also on *Yucca* and old stump of *Musa*.

TYPE LOCALITY: Pennsylvania.

DISTRIBUTION: New York to Missouri and Louisiana.

EXSICCATI: Ellis, N. Am. Fungi, 677, 574. Ravenel, Fungi Am. Exsicc. 645. Other specimens examined: Delaware, *Commons*; Missouri, *Demetrio* (type of *N. pallida* Ellis & Everh.); New York, *Seaver*, *Shear*; Pennsylvania, *Schweinitz* (type of *Sphaeria ochroleuca* Schw.); also cotype of *N. aureofulva* Cooke & Ellis, specimens of *N. depauperata* determined by M. C. Cooke, and specimens of *N. vulgaris* Speg. and *Verticillium tubercularioide* Speg. both from the herbarium of Spegazzini.

The species seems to be very common in the east and south and has been collected by the writer on several kinds of trees and shrubs about New York City. The perithecial clusters are quite variable in size and form and the perithecia themselves variable in color but the species may usually be recognized by the pale perithecia and small, fusoid spores.

### 13. *Creonectria seminicola* (Seaver)

*Nectria seminicola* Seaver, Mycologia 1: 21. 1909.

Conidial phase consisting of white mycelial growth covering the substratum, finally heaping up at various points forming pinkish stromata; conidiophores erect, much branched with branches ascending perpendicularly, each bearing at its summit a single elliptical, hyaline, conidium; conidia  $5-7 \times 2-3$  mic., with 1-2 oil-

drops; perithecia cespitose in dense clusters with the clusters often becoming confluent and covering the most of the exposed surface of the substratum; individual perithecia nearly globose with a minute papilliform ostiolum, smooth or nearly so, 250 mic. in diameter, at first flesh-colored to orange, fading in drying to pale yellow or whitish; asci clavate, 40-50 mic. long, 8-spored; spores mostly 2-seriate or irregularly crowded, hyaline, 1-septate, a little constricted at the septum, 10-14 × 3-3.5 mic. (*pl. 13, f. 5-7*).

On partially decayed seeds of skunk cabbage, *Spathyema foetida* and also on seeds of cultivated beans which are partially decayed.

TYPE LOCALITY: New York City.

DISTRIBUTION: Known only from type locality.

ILLUSTRATIONS: Mycologia 1: *pl. 2, f. 5-9*.

SPECIMENS EXAMINED: New York, *Seaver* (type).

The perithecial and spore characters of this species are identical with those of the preceding with which specimens were carefully compared before describing the species originally. Since describing the present species other information gained in the field has suggested that possibly the two are identical. Attempts to prove the identity of the two species by culture have failed.

#### 14. *Creonectria grammicospora* (Ferd. & Wge.)

*Nectria grammicospora* Ferd. & Wge. Bot. Tidsskrift 29: 11. 1908.

Stromata pulvinate, erumpent; perithecia cespitose, clusters variable in size; individual perithecia subglobose, 300-350 × 200-250 mic. in diameter, fleshy-membranaceous, pallid-ochraceous, slightly white furfuraceous near the base; asci clavate, above truncate, sessile, 35-60 × 8.5-10 mic., 8-spored; spores 2-seriate above, 1-seriate below, ellipsoid, slightly unequal-sided, 12-14 × 5 mic.

On bark of branches.

TYPE LOCALITY: Island of St. Thomas.

DISTRIBUTION: Known only from type locality.

ILLUSTRATIONS: Bot. Tidssk. 29: *pl. 1, f. 3*.

SPECIMENS EXAMINED: St. Thomas, Raunkier 3103 (cotype).

Similar in general appearance to the two preceding species but spores larger with some differences in size of perithecia and other gross characters.



15. *Creonectria tuberculariformis* (Rehm)

*Hypocrea tuberculariformis* Rehm, Ber. Naturh. Ver. Augsburg  
26: 106. 1881.

*Nectria tuberculariformis* Winter; Rabenh. Krypt. Fl. 1<sup>2</sup>: 118.  
1887.

*Hypocreopsis tuberculariformis* Sacc. Syll. Fung. 9: 981. 1891.

Stroma tubercular, rounded or more often elongated, nearly smooth or in dried specimens often longitudinally striated, pinkish or rose-colored becoming dull red with age; perithecia superficial, solitary or more or less crowded, small, averaging about 200 mic. in diameter, smooth or nearly so, globose with a rather prominent papilliform ostiolum becoming slightly collapsed from above when dry; asci clavate, 8-spored,  $40-50 \times 6-7$  mic.; spores 1-2-seriate, mostly 2-seriate above and 1-seriate below, usually a little broader above, fusoid, 1-septate and a little constricted at the septum, with small oil-drops in each cell,  $8-11 \times 3-4$  mic. (*pl.* 13, f. 8-10).

On dead stems of *Urtica* sp., more rarely on old branches and dung.

TYPE LOCALITY: Germany.

DISTRIBUTION: N. Dakota.

SPECIMENS EXAMINED: N. Dakota, *Seaver* (various collections); also Rehm, *Ascomycetes*, 435, 679 (including cotype).

The conidial phase of this fungus was collected commonly in North Dakota but the mature perithecia were less common. The species is very different in the arrangement of the perithecia from any of the other species of the genus.

## DOUBTFUL SPECIES

*Nectria muscivora* (Berk. & Br.) Cooke, Handbk. Brit. Fungi  
2: 786. 1871.

*Sphaeria muscivora* Berk. & Br. Ann. Mag. Nat. Hist. 6: 188.  
1851. *Calonectria muscivora* Sacc. *Michelia* 1: 315. 1878.

"Mycelium forming white, lanose patches 2 inches or more in diameter and rapidly destroying the moss on which it grows. Perithecia collected in little groups more or less connate, half immersed in the mycelium, bright orange, ovate, sometimes collapsing laterally, orifice papillaeform. Asci clavate; sporidia elliptical, pointed at either end, with a central septum, and the endochrome in either articulation bipartite, so that they are probably three-septate when the sporidia are quite mature."

Specimens distributed in Ravenel's Fungi Car Exsic. 57 and Ellis' N. Am. Fungi 1333, both of which have been incorrectly referred to this name, are apparently good specimens of *Sphaerostilbe coccophila* (Desm.) Tul. The type of the present species has not been seen.

*Nectria infusaria* Cooke & Hark. Grevillea 12: 101. 1884.

Stroma (*Fusarium*) pulvinate, pale red; conidia curved, 3-septate, hyaline,  $30-40 \times 2.5$  mic.; perithecia cespitose, erumpent, pallid-red, few in number, soft-membranaceous, subconfluent, smooth, 5-10 on a stroma; asci cylindrical, 8-spored; spores 1-seriate, elliptical, 1-septate, not constricted, hyaline,  $10 \times 4-5$  mic.

On *Acacia* twigs, California. No specimen has been seen.

*Nectria Ipomoeae* Halst. Rep. N. Jersey Agric. Exp. Sta. 12: 281. 1891.

Conidial phase consisting of a *Fusarium*; perithecia cespitose, globose-conical, verrucose-squamulose, red; asci clavate, 8-spored; spores elliptical, 1-septate, slightly constricted, hyaline.

On roots and stems of eggplant.

A note from Mr. Halsted states that the type of this species was probably destroyed. The species seems to be well characterized although no specimens in good condition have been available for examination.

*Nectria Bainii* Masee, Bull. Royal Gardens Kew 1899: 5. 1901.

Perithecia gregarious, seated on a yellowish-red or orange-colored mycelium, globose, red, hairy, finally naked above, 300-350 mic. in diameter; asci clavate-cylindrical, shortly stipitate, 8-spored,  $80-90 \times 7-9$  mic.; spores partially 2-seriate, oblong-elliptical or subacute, 1-septate,  $10-12 \times 5$  mic., hyaline.

Parasitic on cacao pods, Trinidad.

A cotype specimen of this species from Kew is too minute to permit fair examination.

*Nectria ditissima* Tul. Fung. Carp. 3: 73. 1865.

American specimens referred to this name do not differ so far as we can see from *Nectria coccinea* (Pers.) Fries.

*Nectria citisporina* Ellis & Everh. Erythea 1: 197. 1893.

*Nectria microspora* Cooke & Ellis, Grevillea 5: 53. 1876.

17. *Macbridella* gen. nov.

Perithecia in dense cespitose clusters seated on a stroma, bright colored, reddish or yellowish, becoming darker with age, globose to subcylindrical, collapsing or entire; asci cylindrical-clavate, 8-spored; spores elliptical or fusoid, 1-septate, at first hyaline, becoming smoky-brown to brownish-black.

Type species: *Nectria chaetostroma* Ellis & Macbr.

Distinguished from *Creonectria* by the colored spores. The subgeneric name *Phaeonectria* was proposed by Saccardo and based on one of the species here described. Since both of the North American species included in this genus were collected on a botanical expedition sent out from the State University of Iowa, both were originally described in the Bulletin of the Laboratories of Natural History of that Institution, and the type of the genus bears the name of Professor T. H. Macbride as its coauthor, it seems appropriate that the genus should be named in his honor.

Spores small,  $18-20 \times 7-8.5$  mic.; perithecia surrounded with hairs.

1. *M. chaetostroma*.

Spores large,  $35-48 \times 10-12$  mic.; perithecia not surrounded with hairs.

2. *M. striispora*

1. *Macbridella chaetostroma* (Ellis & Macbr.)

*Nectria chaetostroma* Ellis & Macbr.; Ellis & Everh.; Bull. Lab. Nat. Hist. St. Univ. Iowa 4: 70. 1896.

Perithecia in dense irregular clusters 1-5 mm. in diameter, clusters often elongated; individual perithecia globose or subglobose, dark reddish-brown, becoming brownish-black, slightly collapsing becoming pezizoid, surrounded at the base with a growth of brown, crooked, septate hairs, 100-200 mic. long and 3-4 mic. thick; asci clavate,  $75-80 \times 10$  mic., 8-spored; spores 2-seriate or rather irregularly crowded in the ascus, elliptical, straight or curved, 1-septate, slightly constricted, with a distinct oil-drop in each cell, pale brown,  $18-20 \times 7-8.5$  mic.; paraphyses filiform.

On bark of undetermined tree or shrub.

TYPE LOCALITY: Central America.

DISTRIBUTION: Known only from type locality.

EXSICCATI: C. L. Smith, Nicaragua Fungi, 206 (cotype).

"The first appearance is a tuft of dark brown hairs, which are finally hidden and almost obliterated by the densely crowded perithecia 10-40 in number in a compact group 1-4 mm. across."

2. *Macbridella striispora* (Ellis & Everh.)

*Nectria striispora*, Ellis & Everh. Bull. Lab. Nat. Hist. St. Univ. Iowa 2: 398. 1893.

Perithecia in irregular, dense, cespitose clusters as large as 5 mm. in diameter, consisting of 20-100 perithecia each; individual perithecia subcylindrical, tapering above into an obtuse ostiolum which in mature specimens is quite prominent, at first covered with a yellowish furfuraceous coat, finally amber; asci clavate, tapering above, about  $100 \times 15$  mic., 8-spored; spores crowded in the ascus, large, fusoid, straight or curved, 1-septate, with several large oil-drops in each cell, slightly constricted at the septum, pale brown, becoming striated,  $35-48 \times 10-12$  mic.; paraphyses indistinct.

On bark and rotten wood.

TYPE LOCALITY: Central America.

DISTRIBUTION: Known only from type locality.

EXSICCATI: C. L. Smith, Central Am. Fungi, 6.

The spores in this species resemble in size and color the teleuto-spores in some of the common rusts. The striations are quite prominent but do not appear to roughen the outer surface but to be due to some internal markings or contents.

18. GIBBERELLA Sacc. *Michelia* 1: 43 (in note). 1879

Stromata (*Fusarium*) tubercular or more or less effuse; perithecia cespitose or occasionally scattered on or surrounding the stromata; asci clavate, 8-spored, spores fusoid; 3-many-septate, hyaline.

Type species: *Sphaeria pulicaris* Fries.

1. GIBBERELLA PULICARIS (Fries); Sacc. *Michelia* 1: 43 (in note). 1879

*Sphaeria pulicaris* Fries; Kunze & Schm. Myk. Hefte 2: 37. 1823.

*Gibbera pulicaris* Fries, Summa Veg. Scand. 402. 1849.

*Botryosphaeria pulicaris* Ces. & Not. Comm. Soc. Critt. It. 1: 212. 1863.

Perithecia in cespitose clusters .5-1 mm. in diameter, seated on a stroma or occasionally more or less scattered around it, ovate with a rather prominent ostiolum, minutely rough, finally collapsing, black to the unaided eye, blue with transmitted light; asci

clavate, tapering above, 8-spored,  $50-55 \times 10$  mic.; spores crowded in the ascus, fusiform, straight or curved, 3-septate, hyaline or slightly yellowish,  $18-20 \times 5-6$  mic.

On corn stalks, herbaceous stems and bark of trees and shrubs.

TYPE LOCALITY: Europe.

DISTRIBUTION: New Jersey to N. Dakota, Kansas and W. Virginia.

ILLUSTRATIONS: Ellis & Everh. N. Am. Pyrenom. *pl.* 13, *f.* 1-6; E. & P. Nat. Pfl. Fam. *f.* 240, G-J.

EXSICCATI: Ellis, N. Am. Fungi, 81; Wilson & Seaver, Ascom. & Lower Fungi, 32. Other specimens examined: N. Jersey, Ellis, *Commons*; W. Virginia, *Nuttall*; Iowa, *Seaver*; N. Dakota, *Seaver*.

#### DOUBTFUL SPECIES

*Gibberella Saubinetii* (Durien & Mont.) Sacc. *Michelia* 1: 513.

*Sphaeria Saubinetii* Durien & Mont.; Durien; U. Alger. Crypt. 1: 479. 1846? *Gibbera Saubinetii* Mont. Syll. Crypt. 252. 1856.

*Gibberella ficini* (Cooke & Hark.) Ellis & Everh. N. Am. Pyrenom. 120. 1892.

#### 19. *Scoleconectria* gen. nov.

*Ophionectria* Sacc. (in part).

Stroma subglobose, tubercular or depressed; perithecia superficial on or surrounding the stroma, in dense clusters or more or less evenly scattered; asci 2-8-spored, cylindrical to clavate; spores 3-many-septate, fusoid to subfiliform, hyaline, or subhyaline.

Type species: *Ophionectria scolecospora* Bref.

Distinguished from *Creonectria* by the many-septate spores and from *Ophionectria* by the presence of a stroma. Characterized by its worm-like spores.

Spores filiform or subfiliform, very long.

On dead branches of *Pinus*; spores  $40-50 \times 2.5-3$  mic.

1. *S. scolecospora*.

On scale insects; spores clavate,  $100-120 \times 6-7$  mic.

2. *S. coccicola*.

Spores fusoid or subelliptical, comparatively short.

Stroma prominent, tubercular, 1-2 mm. high.

3. *S. canadensis*.

Stroma depressed, inconspicuous.

Spores subelliptical, curved.

4. *S. polythalama*.

Spores fusiform or subfusiform.

Perithecia red; ascospores accompanied by smaller spore-like bodies.

5. *S. balsamea*.

Perithecia yellowish to brownish; spore-like bodies absent.

6. *S. Atkinsonii*.

### 1. *Scoleconectria scolecospora* (Bref.)

? *Nectria cylindrospora* Sollm. Bot. Zeit. 22: 265. 1864.

*Ophionectria scolecospora* Bref. Unters. Myk. 10: 178. 1891.

*Chilonectria Cucurbitula* Ellis & Everh. N. Am. Pyrenom. 116. 1892.

Perithecial clusters quite regular, rounded, composed of numerous, densely cespitose perithecia; individual perithecia dull red at first slightly furfuraceous, becoming quite smooth, nearly globose, finally collapsing becoming pezizoid; asci clavate to cylindrical,  $60-75 \times 8-10$  mic., filled with numerous spore-like bodies, often obscuring the long cylindrical spores; spores usually more or less curved, many-septate with the septa transverse or extending irregularly, delicate,  $40-50 \times 2.5-3$  mic.

On branches of different species of *Pinus*.

TYPE LOCALITY: Germany.

DISTRIBUTION: New Jersey.

ILLUSTRATIONS: Brefeld, Unters. Myk. 10: pl. 5, f. 45; Ellis & Everh. N. Am. Pyrenom. pl. 12, f. 9-12; E. & P. Nat. Pl. Fam. 1<sup>1</sup>: f. 241, D.

EXSICCATI: Ellis & Everh. N. Am. Fungi, 1551.

Distinguished by the long cylindrical spores with the accompanying minute spore-like bodies. The species cannot be distinguished on gross characters.

No type specimen of this species has been examined but the description and illustration by Brefeld leave little doubt as to its identity. The species has been confused with other species occurring on the same habitat and with similar gross characters.

### 2. *Scoleconectria coccicola* (Ellis & Everh.)

*Nectria coccicola* Ellis & Everh. Jour. Myc. 2: 39. 1886.

*Dialonectria coccicola* Ellis & Everh. Jour. Myc. 2: 137. 1886.

*Ophionectria coccicola* Berl. & Vog.; Sacc. Syll. Add. 4: 218. 1886.

Stroma rounded, more or less prominent, whitish; conidia borne in clusters of 3-5, large, broad at the base, tapering into a bristle-like apex, 15-20-septate,  $100-150 \times 7-7.5$  mic. with a distinct stem-like base; perithecia in cespitose clusters, nearly globose or a little longer than broad, reddish becoming dark brownish, minutely roughened, at first clothed with a few hyaline hairs, then naked, 300-500 mic. in diameter; asci cylindrical, tapering below into a stem-like base,  $150-200 \times 20$  mic.; spores clavate or subcylindrical,  $100-120 \times 6-7$  mic. at the base, 15-20-septate, hyaline.

On dead scale insects on the bark of living orange trees.

TYPE LOCALITY: Florida.

DISTRIBUTION: Florida and Cuba.

ILLUSTRATIONS: Bull. Fl. Agric. Exp. Sta. 94: 12, f. 8-14.

SPECIMENS EXAMINED: Florida, *Southworth* (type).

The conidia of this species resemble very closely both in size and form the ascospores but are much more acutely pointed and may also be distinguished by the manner in which they are borne.

### 3. *Scoleconectria canadensis* (Ellis & Everh.)

*Nectria canadensis* Ellis & Everh. Bull. Torrey Club 11: 74. 1884.

*Calonectria canadensis* Berl. & Vog.; Sacc. Syll. Fung. Add. 212. 1886.

Stroma (*Tubercularia*) 1-2 mm. high, with an orange head and dull red base; conidia minute, elliptical, hyaline, about  $5 \times 2$  mic.; perithecia springing in dense clusters from the base of the stroma, finally surrounding and often covering it; individual perithecia nearly globose, brick-red, 250-300 mic. in diameter, at first tubercular and rough finally becoming more or less smooth and slightly collapsing; asci clavate,  $75-100 \times 12-15$  mic., 8-spored; spores crowded, elliptical, straight or curved, hyaline, 3-septate,  $18-20 \times 7$  mic. (*pl.* 13, f. 13-14).

On the bark of *Ulmus* sp.

TYPE LOCALITY: Ontario, Canada.

DISTRIBUTION: Reported only from type locality.

ILLUSTRATIONS: Ellis & Everh. N. Am. Pyrenom. *pl.* 13, f. 7-14.

EXSICCATI: Ellis & Everh. N. Am. Fungi, 2547; Ellis & Everh. Fungi Columbiani, 226. Other specimens examined: Ontario, Canada, *Dearness*, various collections.

The species is distinct in its prominent stroma.

4. *Scolecconectria polythalama* (Berk.)

*Nectria polythalama* Berk.; Hooker's Fl. N. Zealand 2: 203. 1853.

*Nectria auriger* Berk. & Rav. Grevillea 4: 46. 1875.

*Calonectria polythalama* Sacc. Michelia 1: 308. 1878.

Perithecia erumpent in dense clusters 1–2 mm. long and about 1 mm. broad; seated on a yellowish stroma; individual perithecia subglobose, at first covered with a yellowish-green coat of powdery material which finally disappears leaving the perithecia of a dull red color, finally collapsing; asci cylindrical or clavate, 50–60 × 12–15 mic., 8-spored; spores crowded, elliptical, curved, yellowish-hyaline, 7-septate (mostly), 18–22 × 5 mic.

On *Chionanthus*, *Fraxinus* and *Liquidambar*.

TYPE LOCALITY: New Zealand.

DISTRIBUTION: Virginia to Alabama.

ILLUSTRATIONS: Brekeley, Hooker's Fl. N. Zealand 2: *pl.* 116, *f.* 15.

EXSICCATI: Ellis, Fungi Nova Caesareenses, 69; Ellis, N. Am. Fungi, 79; Ravenel, Fungi Car. Exsicc. 54, 60. Other specimens examined: Virginia, *Commons*.

The perithecia are greenish in some specimens and reddish in others, the difference in color being due to the presence or absence of the greenish powdery material with which the perithecia are clothed. This difference in color seems to have been the distinguishing character of the two species, *N. polythalama* Berk. and *N. auriger* Berk. & Rav.

5. *Scolecconectria balsamea* (Cooke & Peck)

*Nectria balsamea* Cooke & Peck, Ann. Rep. N. Y. State Mus. 26: 84. 1874. Grevillea 12: 81. 1884.

? *Calonectria Cucurbitula* Sacc. Michelia 1: 312. 1878.

*Calonectria balsamea* Sacc. Syll. Fung. 9: 986. 1891.

Perithecial clusters small, 1–2 mm. in diameter, erumpent through the outer bark; individual perithecia nearly globose smooth or only minutely rough, red; in dried specimens dull brick-red, entirely collapsing, becoming pezizoid; asci cylindrical to clavate, at first filled with numerous minute, spore-like bodies about 2 × 1 mic. among which are several (2–4) true spores; spores fusiform, 5–6-septate, granular within, 15–25 × 4–5 mic.



On the branches of *Abies balsamea*.

TYPE LOCALITY: North Elba, New York.

DISTRIBUTION: New York to Minnesota and Newfoundland.

SPECIMENS EXAMINED: Minnesota, *Arthur, Bailey & Holway*; Newfoundland, *Waghorne*; New York, *Peck*.

Distinguished by the fusiform, many-septate spores.

On gross characters the species cannot be distinguished from *Scoleconectria scolecospora* (Bref.) Seaver, however the habitat of the two species is different and this so far as our observations have gone is constant. The spore characters of the two species are very different.

From the presence of the minute spore-like bodies which often obscure the true ascospores this species is also likely to be confused with *Nectria Coryli* Fuckel.

*Chilonectria Rosellinii* (Carest.) Sacc. may also be identical with this species but in the absence of specimens it is impossible to determine.

## 6. *Scoleconectria Atkinsonii* (Rehm)

*Calonectria Atkinsonii* Rehm, Ann. Myc. 2: 178. 1904.

Perithecia erumpent in dense clusters 1–2 mm. in diameter; individual perithecia subconical, tapering into a prominent obtuse ostiolum, at first densely yellow-furfuraceous with the ostiolum bare and darker-colored, finally becoming bare and dark brownish-black; asci clavate with a subtruncate apex and slender stem-like base, 90–100 × 15–17 mic., 8-spored; spores fusoid or subfusiform, at first 1-septate becoming 3-septate and constricted at the middle septum, mostly curved, hyaline or subhyaline, 27–33 × 8–9 mic.; paraphyses filiform, 3 mic. in diameter.

On dead branches of *Acer, Crataegus, Tilia*, etc.

TYPE LOCALITY: New York.

DISTRIBUTION: New York to Ontario, Canada.

EXSICCATI: Ellis & Everh. Fungi Columbiani, 2006 (as *Calonectria chlorinella* (Cooke) Ellis & Everh.). Other specimens examined: New York, *Atkinson 5240* (cotype), *Cooke*; Ontario, Canada, *Dearness*.

The species was described by Ellis & Everh. N. Am. Pyrenom. 113 as *Calonectria chlorinella* (Cooke) Ellis & Everh., with which species it has often been confused.

## 20. ECHINODOTHIS Atk.; Bull. Torrey Club 21: 224. 1894

Stroma subfleshy or corky, light colored, pulvinate to subglobose or irregular in form, often constricted at the base, sometimes entirely surrounding the host, consisting of several layers of different consistency; perithecia superficial, scattered, subcylindrical, sessile, giving an echinulate appearance to the stroma; asci cylindrical, 8-spored; spores linear, septate, at length separating at the septa into short segments.

Type species: *Hypocrea tuberiformis* Berk. & Rav.

## 1. ECHINODOTHIS TUBERIFORMIS (Berk. &amp; Rav.) Atk. Bull. Torrey Club 21: 224. 1894

*Hypocrea tuberiformis* Berk. & Rav. Grev. 4: 13. 1875.

*Dussiella tuberiformis* Patouillard, Soc. Myc. France 6: 107 (in part). 1890.

*Hypocrella tuberiformis* Atkinson, Bot. Gaz. 16: 282. 1891.

Stroma subglobose, 1 cm. or more in diameter, entire, lobed or divided, seated upon the reed or upon the leaf sheath and fastened by a whitish mycelium consisting of radiating threads which are sometimes tinged yellowish brown; substance leathery or corky, consisting of three layers, an inner layer white to pinkish, an intermediate layer light ochre and an outer layer cinnamon; stroma externally dark brownish becoming black; conidiophores needle-shaped; conidia oval to fusoid,  $3-4 \times 7-10$  mic.; perithecia entirely superficial in small clusters or evenly distributed over the exposed surface of the stroma; subconical in form, giving the whole stroma a spiny appearance; clothed except the apex with a dense covering of minute threads which are at first whitish becoming cinnamon-colored, the naked apex becoming black, about  $.3 \times 1$  mm.; asci 8-spored cylindrical, with a swelling at the apex, very large,  $475-750 \times 14-20$  mic.; spores nearly as long as the ascus, hyaline or slightly yellowish, many-septate, joints  $15 \times 4-5$  mic. (*pl. 13, f. 15*).

On stems of *Arundinaria*.

TYPE LOCALITY: South Carolina.

DISTRIBUTION: South Carolina to Alabama.

ILLUSTRATIONS: Atkinson, Bot. Gaz. 16: *pl. 25*.

EXSICCATI: Ravenel, Fungi Am. Exsicc. 733. Other specimens examined: Alabama, *Atkinson 2218*; South Carolina, *Ravenel 619*.

The first description of this species was evidently drawn from

sterile specimens which probably accounts for its having been placed in the genus *Hypocrea*. A note from Kew made from examination of Berkeley and Ravenel's specimen No. 1220 states "no spores visible." Small cavities beneath the surface of the stroma were evidently mistaken for the perithecia. This is the number from which the description was drawn in Grevillea 4: 13.

Other specimens examined from the Ravenel collection show mature perithecia. The spore characters suggest *Hypocrella* or *Epichloe* but the superficial position of the perithecia bar it from either of those genera in both of which the perithecia are entirely immersed or with the necks slightly protruding.

21. THYRONECTRIA Sacc. Grevillea 4: 21. 1875

*Pleonectria* Sacc. Nuov. Giorn. Bot. It. 8: 178. 1876.

Stroma erumpent-superficial or subimmersed with the perithecia in dense cespitose clusters; individual perithecia subglobose, smooth or rough or often clothed with a yellowish-green, furfuraceous coat which sometimes disappears with age leaving the perithecia dark colored, red to brownish, collapsing or entire; asci 8-spored, cylindrical to clavate; spores hyaline, when mature many-septate and muriform, often accompanied by minute spore-like bodies which are much smaller in size.

Type species: *Thyronectria Patavina* Sacc.

Distinguished by the muriform, hyaline spores.

Spores elliptical, 2 times as long as broad.

Perithecia subimmersed, greenish.

1. *T. pyrrochlora*.

Perithecia erumpent-superficial, not green.

Perithecia dark brownish; spores small,  
10-15 × 7-9 mic.

2. *T. denigrata*.

Perithecia reddish; spores large, 16-30 mic. long.

Spores 20-30 × 10-12 mic., on bark of

*Carya*.

3. *T. missouriensis*.

Spores 16-20 × 7-8 mic., on *Ribes*.

4. *T. berlinensis*.

Spores subelliptical, accompanied by minute spore-like bodies.

5. *T. sphaerospora*.

I. THYRONECTRIA PYRRHOCHLORA (Auers.) Sacc. Michelia

1: 325. 1878

*Nectria pyrrochlora* Auers. Hedwigia 8: 88. 1869.

*Valsa Xanthoxyli* Peck, Ann. Rep. N. Y. St. Mus. 31: 49. 1879.

*Pseudovalia xanthoxyli* Sacc. Syll. Fung. 2: 137. 1883.

*Fenestella Xanthoxyli* Sacc. Syll. Fung. 2: 332. 1883.

*Pleonectria pyrrohochlora* Winter; Rabenh. Krypt. Fl. 1<sup>2</sup>: 108. 1887.

*Thyronectria virens* Hark.; Ellis & Everh. N. Am. Pyrenom. 92. 1892.

*Thyronectria Xanthoxyli* Ellis & Everh. N. Am. Pyrenom. 92. 1892.

Perithecia cespitose in rounded or elongated clusters, seated on the inner bark, finally bursting through the epidermis, becoming more or less superficial, often so densely cespitose that the perithecia appear to be united, at first covered with a thin olive-green tomentum, or powdery material, with the ostiolum protruding and bare, the entire perithecium becoming more or less bare with age, about 300 mic. in diameter; asci clavate, 100–125 mic. long, 8-spored; spores crowded, elliptical, straight or curved, hyaline or slightly yellowish, many-septate and muriform, 18–24 × 7–8 mic.

On branches of *Acer*, *Fraxinus* and *Xanthoxylum*.

TYPE LOCALITY: Europe.

DISTRIBUTION: New York to Ontario and Ohio.

EXSICCATI: Ellis & Everh. N. Am. Fungi, 2546, 3310. Other specimens examined: Ohio, *Morgan*; Ontario, *Dearness* 1484.

## 2. *Thyronectria denigrata* (Winter)

*Pleonectria denigrata* Winter, Bull. Torrey Club 10: 49. 1883.

Perithecia erumpent in very dense, large, rounded clusters 2–5 mm. in diameter, seated on a brownish stroma; individual perithecia nearly globose, minutely roughened, dark brownish with a prominent, black, shining ostiolum finally becoming black, 350–450 mic. in diameter; asci cylindrical, 50–70 × 8–10 mic., 8-spored; spores 1-seriate or crowded, short elliptical, hyaline or slightly yellowish, 3–5-septate, becoming muriform, often a little constricted, 10–15 × 7–9 mic.

On branches of *Gleditschia triacanthos*.

TYPE LOCALITY: Lexington, Kentucky.

DISTRIBUTION: Delaware to Kansas and Kentucky.

EXSICCATI: Ellis, N. Am. Fungi, 1334; Ellis & Everh. N. Am. Fungi, 2372. Other specimens examined: Delaware, *Commons*; Kansas, *Bartholomew*; Kentucky, *Kellerman*; Missouri, *Webber*; Ohio, *Morgan*.

3. *Thyronectria missouriensis* (Ellis & Everh.)

*Nectria missouriensis* Ellis & Everh. Jour. Myc. 4: 57. 1888.

*Pleonectria missouriensis* Sacc. Syll. Fung. 9: 990. 1891.

*Paronectria missouriensis* Rabenhorst-Winter, Fungi Europaei, 3748. 1891.

Perithecia cespitose on the stroma in clusters of 6–20, dull red, nearly globose, smooth or minutely rough, with a prominent ostiolum, usually not collapsing, 250–300 mic. in diameter; asci clavate, 100–120 × 12–15 mic., 8-spored; spores crowded irregularly in the ascus, large, elliptical, straight or a little curved, hyaline or very slightly yellowish, 6–7-septate, with several longitudinal septa, dividing the spore into numerous small cells, 20–30 × 10–12 mic.

On bark of *Carya*.

TYPE LOCALITY: Concordia, Missouri.

DISTRIBUTION: Delaware to Missouri.

SPECIMENS EXAMINED: Missouri, *Demetrio* 276.

Distinguished from *T. berolinensis* (Sacc.) Seaver by the larger size of the spores as well as by the difference in host and a slight variation in perithecial characters.

4. *Thyronectria berolinensis* (Sacc.)

*Nectria Ribis* Niessl, Verh. Nat. Ver. Brumm 2: 114 (homonym). 1865.

*Pleonectria berolinensis* Sacc. Michelia 1: 123. 1878.

*Pleonectria Ribis* Karst. Medd. Soc. Fauna Fl. Fenn. 5: 42. 1879.

Perithecia erumpent in large cespitose clusters 1–3 mm. in diameter on a stroma which becomes indistinct in aged specimens; individual perithecia dull brick-red becoming darker with age and often quite black, smooth or nearly so, entirely collapsing becoming pezizoid with age, 250–300 mic. in diameter; asci cylindrical-clavate, 8-spored; spores 1-seriate, elliptical, 5–9-septate and muriform, hyaline or very slightly yellowish, 16–20 × 7–8 mic.

On dead branches of *Ribes* (wild and cultivated).

TYPE LOCALITY: Germany.

DISTRIBUTION: Massachusetts to Montana.

ILLUSTRATIONS: Ellis & Everh. N. Am. Pyrenom. pl. 12, f. 7–8.

EXSICCATI: Ellis, N. Am. Fungi, 470; Ellis & Everh. Fungi

Columbiani, 26, 470. Other specimens examined: Montana, *Anderson* 396; Iowa, *Holway*; Massachusetts, *Farlow*; N. Dakota, *Seaver* (various collections).

5. **Thyronectria sphaerospora** (Ellis & Everh.)

*Nectria sphaerospora* Ellis & Everh.; Bessey & Webber, Ann. Rep. Neb. St. Board Agric. 1889: 193. 1890.

*Chilonectria crinigera* Ellis & Everh. Proc. Acad. Nat. Sci. Phil. 1890: 246. 1891.

Perithecia cespitose on a tubercular stroma in small clusters of 3-12 each; individual perithecia subglobose, papillate, minutely rough, at first covered with a brownish furfuraceous coat, finally bare and nearly black, slightly collapsing or entire, about 300-400 mic. in diameter; asci clavate, about  $50-70 \times 12-15$  mic. at first filled with numerous minute spore-like bodies  $2-3 \times 1$  mic., among which are the true spores, 8 in each ascus; ascospores subglobose, mostly 1-seriate, becoming about 3-septate and muriform, 5-8 mic. in diameter, surrounded by numerous spore-like bodies which appear like minute appendages.

On bark of *Fraxinus* and *Gleditschia*.

TYPE LOCALITY: Lincoln, Nebraska.

DISTRIBUTION: Known only from type locality.

SPECIMENS EXAMINED: Nebraska, *Webber* (type).

22. **Thyronectroidea** gen. nov.

Perithecia cespitose in erumpent clusters as in *Thyronectria*; asci clavate-cylindrical, 8-spored; spores elliptical, many-septate, becoming muriform, at first hyaline, becoming dark brown.

Type species: *Thyronectria chrysogramma* Ellis & Everh.

Distinguished from *Thyronectria* by the colored spores.

1. **Thyronectroidea chrysogramma** (Ellis & Everh.)

*Thyronectria chrysogramma* Ellis & Everh. Proc. Acad. Nat. Sci. Phil. 1890: 245. 1891.

*Mattirolia chrysogramma* Sacc. Syll. Fung. 9: 993. 1891.

Perithecia springing from below the epidermis in dense cespitose clusters of 3-6 perithecia each; individual perithecia ovate, .25-.5 mm. in diameter, clothed with a greenish-yellow coat with the ostiolum bare and black; asci clavate-cylindrical,  $150-175 \times 14-18$  mic., 8-spored; spores 2-seriate, elliptical, mostly a little

curved, 7-10-septate, with very faint, interrupted, longitudinal septa, at first hyaline, becoming quite dark brown,  $25-35 \times 10-12$  mic.; paraphyses abundant.

On bark of *Ulmus americana*.

TYPE LOCALITY: Manhattan, Kansas.

DISTRIBUTION: Kansas to Ontario and New York.

SPECIMENS EXAMINED: Ohio, *Morgan*; Ontario, Canada, *Dearness*.

NEW YORK BOTANICAL GARDEN.

#### EXPLANATION OF PLATE XIII.

1. *Megalonectria pseudotrichia* (Schw.) Speg.,  $\times 25$ .
2. *Megalonectria pseudotrichia* (Schw.) Speg., asci and spores,  $\times 400$ .
3. *Creonectria pithoides* (Ellis & Everh.) Seaver, natural size.
4. *Creonectria pithoides* (Ellis & Everh.) Seaver,  $\times 25$ .
5. *Creonectria seminicola* Seaver, two thirds natural size.
6. *Creonectria seminicola* Seaver,  $\times 25$ .
7. *Creonectria seminicola* Seaver, conidiophores,  $\times 400$ .
8. *Creonectria tuberculariformis* (Rehm) Seaver, natural size.
9. *Creonectria tuberculariformis* (Rehm) Seaver,  $\times 10$ .
10. *Creonectria tuberculariformis* (Rehm) Seaver, conidiophores,  $\times 400$ .
11. *Creonectria rubicarpa* (Cooke) Seaver, natural size.
12. *Creonectria rubicarpa* (Cooke) Seaver,  $\times 25$ .
13. *Scoleconectria canadensis* (Ellis & Everh.) Seaver,  $\times 25$ .
14. *Scoleconectria canadensis* (Ellis & Everh.) Seaver, asci and spores,  $\times 400$ .
15. *Echinodthis tuberiformis* (Berk. & Rav.) Atk.,  $\times 2$ .